FIGURE 1. SCHEMATIC BLOCK DIAGRAM OF A
VERTICAL SPATIAL FILTERING CIRCUIT.
(RELATED ART)
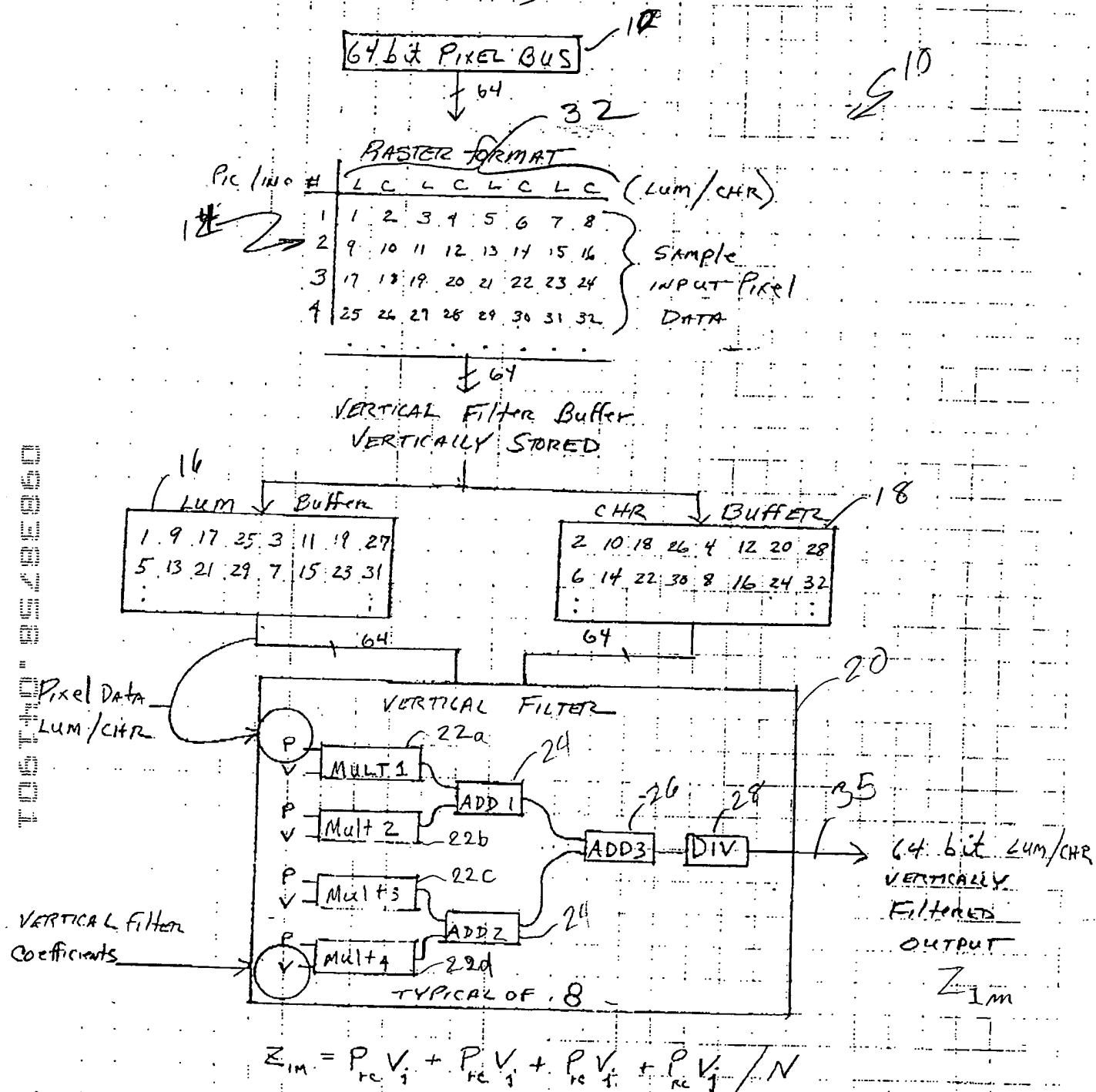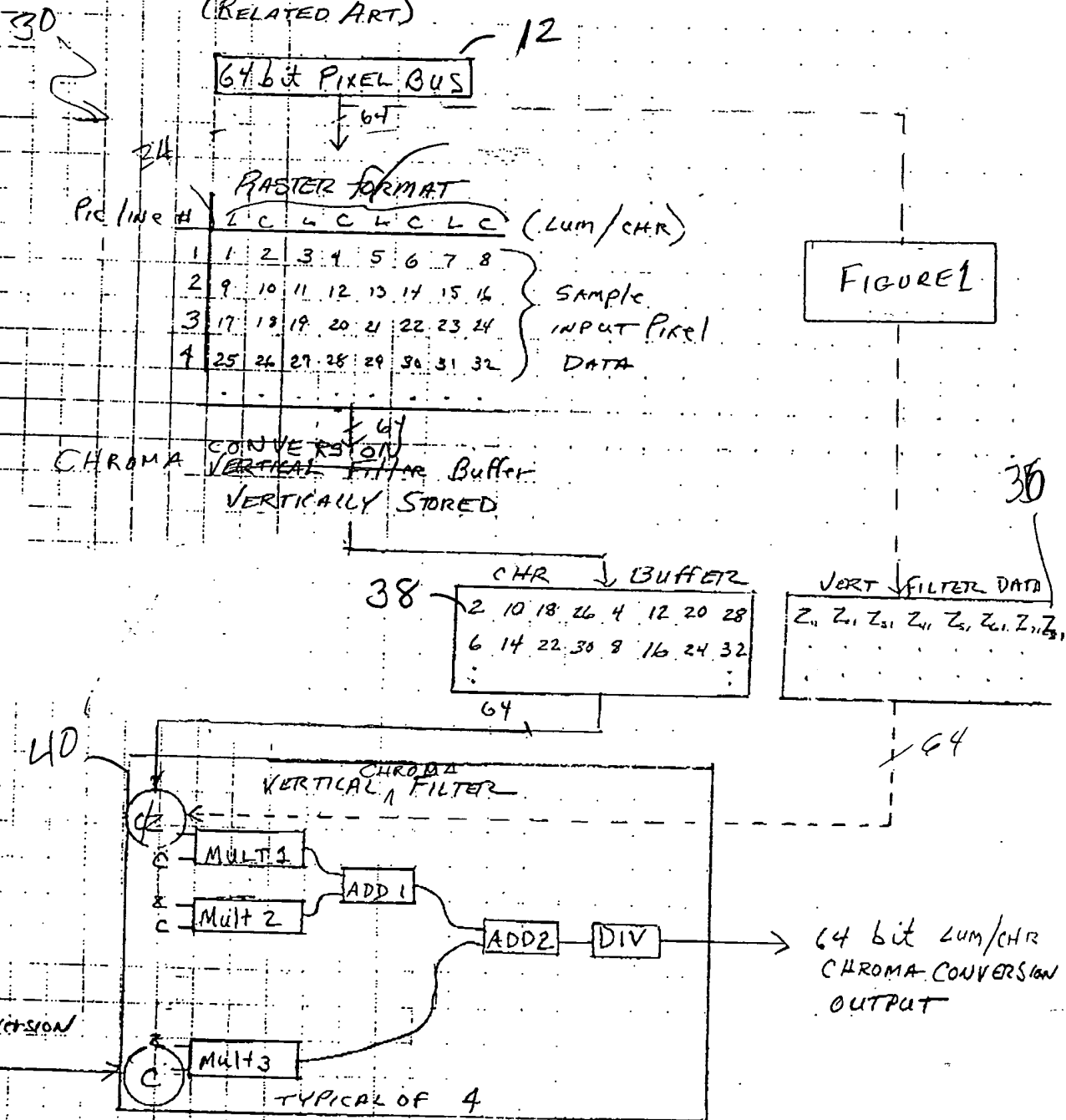
$\boxed{\text{64 bit PIXEL BUS}}$ — 12

↓ 64

10

32

RASTER FORMAT

Pic/line #

L	C	L	C	L	C	L	C	(Lum/CHR)
1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	Sample
17	18	19	20	21	22	23	24	INPUT PIXEL
25	26	27	28	29	30	31	32	DATA

14

↓ 64

VERTICAL FILTER BUFFER
VERTICALLY STORED

16

LUM BUFFER

| 1 | 9 | 17 | 25 | 3 | 11 | 19 | 27 |
| 5 | 13 | 21 | 29 | 7 | 15 | 23 | 31 |

18

CHR BUFFER

| 2 | 10 | 18 | 26 | 4 | 12 | 20 | 28 |
| 6 | 14 | 22 | 30 | 8 | 16 | 24 | 32 |

64   64

20

Pixel Data
LUM/CHR

VERTICAL FILTER

P / V — MULT 1 — 22a
P / V — Mult 2 — 22b
P / V — Mult 3 — 22c
P / V — Mult 4 — 22d

ADD 1 — 24
ADD 2 — 24

ADD3 — 26   DIV — 28   35

VERTICAL FILTER
Coefficients

TYPICAL OF 8

64 bit LUM/CHR
VERTICALLY
FILTERED
OUTPUT

Z_{1m}

$$Z_{IM} = P_{re} V_1 + P_{re} V_1 + P_{re} V_1 + P_{re} V_1 \,/\, N$$

FIGURE 2   SCHEMATIC BLOCK DIAGRAM OF A
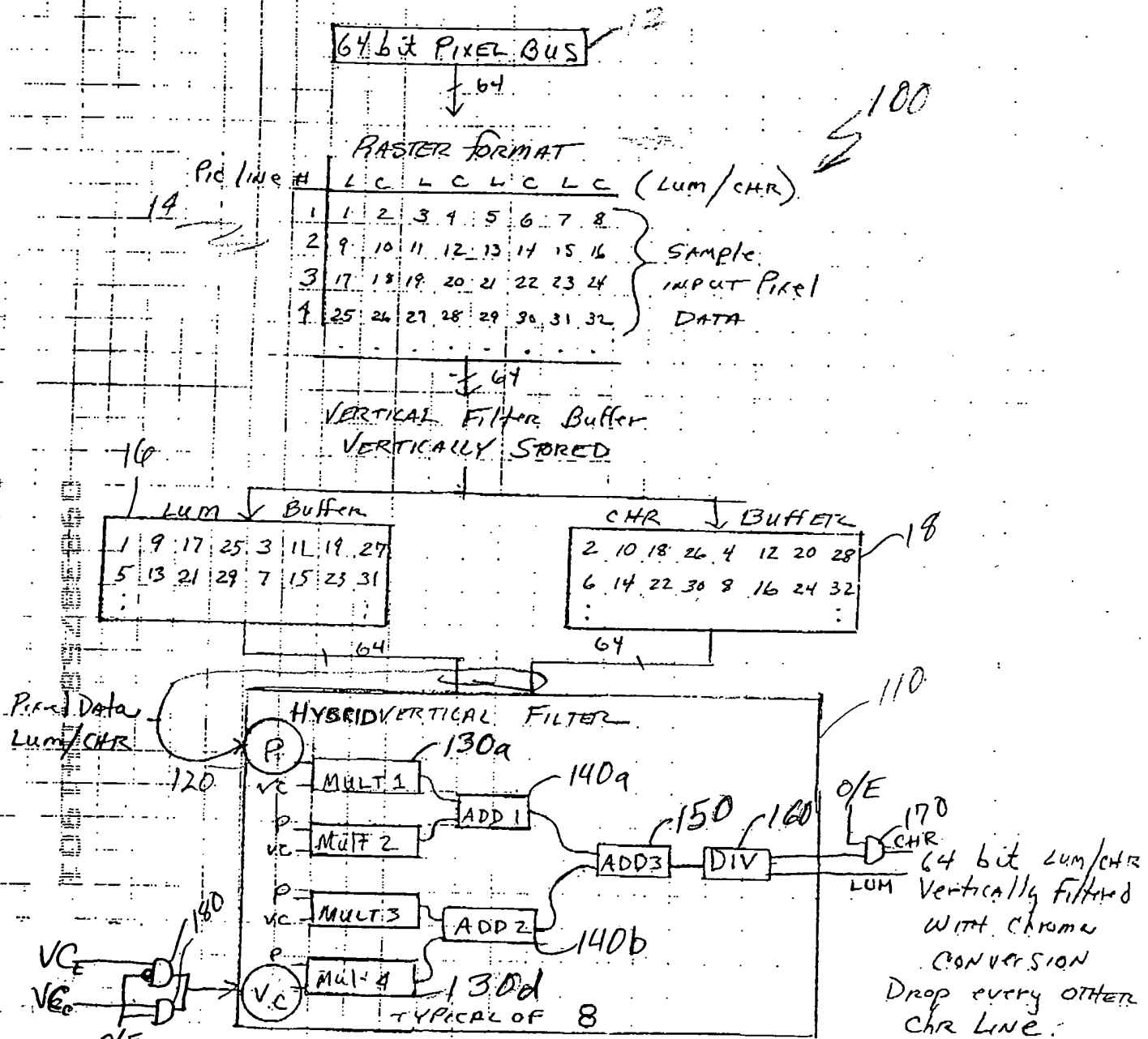VERTICAL CHROMA CONVERSION CIRCUIT.
(RELATED ART)

30

12

64 bit PIXEL BUS

↓64

RASTER FORMAT

Pic line #   L C L C L C L C   (LUM/CHR)

1	1	2	3	4	5	6	7	8
2	9	10	11	12	13	14	15	16
3	17	18	19	20	21	22	23	24
4	25	26	27	28	29	30	31	32

} SAMPLE INPUT PIXEL DATA

24

FIGURE 1

CHROMA CONVERSION VERTICAL FILTER Buffer
VERTICALLY STORED

↓64

36

38

CHR   ↓ BUFFER

| 2 | 10 | 18 | 26 | 4 | 12 | 20 | 28 |
| 6 | 14 | 22 | 30 | 8 | 16 | 24 | 32 |

64

VERT ↓ FILTER DATA

$Z_1, Z_2, Z_3, Z_4, Z_5, Z_6, Z_7, Z_8,$

/64

40

VERTICAL CHROMA FILTER

C   MULT 1
&   MULT 2   ADD 1
C   ADD2   DIV   → 64 bit LUM/CHR CHROMA CONVERSION OUTPUT

Chroma Conversion Coefficients → C   MULT 3

TYPICAL OF 4

$$X_{no} = Z_{im} C_{K} + Z_{im} C_{K} + Z_{im} C_{K}$$

FIGURE 3   SCHEMATIC BLOCK DIAGRAM OF A
VERTICAL FILTER/CHROMA CONVERSION CIRCUIT

64 bit PIXEL BUS

↓ 64

~100

RASTER FORMAT

Pic line #   L C L C L C L C   (LUM/CHR)

~14

	L C L C L C L C	
1	1 2 3 4 5 6 7 8	
2	9 10 11 12 13 14 15 16	SAMPLE
3	17 18 19 20 21 22 23 24	INPUT PIXEL
4	25 26 27 28 29 30 31 32	DATA

↓ 64

VERTICAL FILTER BUFFER
VERTICALLY STORED

~16

LUM ↓ BUFFER

1	9	17	25	3	11	19	27
5	13	21	29	7	15	23	31

CHR ↓ BUFFER   ~18

2	10	18	26	4	12	20	28
6	14	22	30	8	16	24	32

64   64

~110

HYBRID VERTICAL FILTER

Pixel Data
Lum/CHR

P ~120   130a   140a

VC MULT 1
P   MULT 2   ADD 1
VC

~150 ~160   O/E   ~170
ADD 3   DIV   CHR

P   MULT 3
VC   ADD 2   140b
P   MULT 4
VC ~140

VC   O/E
VCc

V.C   130d

TYPICAL OF 8

LUM 64 bit LUM/CHR
Vertically Filtered
With CHROMA
CONVERSION
Drop every OTHER
CHR Line.

$V_o = P_{RC} V_j C_k + P(VC+VC) + P(VC+VC+VC) + P(VC+VC+VC) + P(VC+VC) + PVC$